METHOD STATEMENT
INSTALLATION OF FENCE BRIDGES AND DROP STRUCTURES

Documents Attached

1 Method Statement

2 QCP/ITP

3 Risk Assessment

	Signature	Date
Approved by: Project Manager SA Fence & Gate		
Approved by: Project Manager Kusile Power Station		

INTRODUCTION

THE PURPOSE OF THIS DOCUMENT IS TO OUT LINE ALL THE WORK THAT SA FENCE AND GATE WILL BE DOING DURING THE KUSILE PROJECT. THIS WILL INCUDE ALL THE WORK PROCEDURES AND INSTRUCTION THAT ARE MADE BY THE SHE AND KUSILE SPECIFICATIONS

SCOPE

THIS METHOD STATEMENT WILL APPLY TO THE INSTALATION OF BRIDGES AND DROP STRUCTURES AS PER DRAWINGS SUPPLIED BY ESKOM KUSILE.

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1. SITE ESTABLISHMENT

Site Establishment was executed as per approved method statement.

2. MATERIAL DELIVERY

All material delivered to Kusile site will be delivered to SA Fence and Gate site lay down area. All material will be inspected and approved by client before installation as per quality control procedures (refer to Risk Assessment RA 003) and transported to site by LDV with a trailer.

3. DEFINITIONS, TERMS, ABBREVIATIONS

- "QA/QC" MEANS QUALITY ASSURANCE /QUALITY CONTROL OFFICER
- "PPE" MEANS PERSONAL PROTECTIVE EQUIPMENT
- "EO" MEANS ENVIROMENTAL OFFICER
- "CR" MEANS CONSTRUCTION REGULATION
- "EMP" MEANS ENVIROMENTAL MANAGEMENT PLAN
- "OHSA" MEANS OCCUPATIONAL HEALTH AND SAFETY ACT
- "LDV" MEANS LITE DELIVERY VEHICLE
- *"MOD AASHTO" MEANS Maximum density: The maximum density of a material for a specific compaction effort is the highest density obtainable when the compaction is carried out on the material at varied moisture contents.*

  Optimum moisture content: The optimum moisture content for a specific compaction effort is the moisture content at which the maximum density is obtained.

4. REFERENCES

- PROJECT KUSILE POWER STATION STANDARDS ENVIROMENTAL SPECIFICATION
- ENVIROMENTAL MANAGEMENT PLAN
- CONSTRUCTION REGULATION 2003
- OCCUPATIONAL HEALTH AND SAFETY ACT, ACT NO 85 OF 1993

5. RESPONSIBILITIES, AUTHORITY, ACCOUNTABILITY

The preparation, review and approval of this procedure are the responsibility of:

- Preparation : Site Manager
- Review : Contracts Manager
- Approval : Project Manager (Eskom Kusile Power Station)
- The requirements of this Method Statement is binding on all SA FENCE AND GATE employees and contracting bodies.
- Site Agent and Foreman are responsible for ensuring this activity is carried out in accordance with this Method Statement.
- QA/QC officers are also responsible for ensuring that this activity is carried out in accordance with this Method Statement and that necessary inspection will be done.

6. STRIPPING AND STOCKPILE AREA

Stripping shall be done for the following reasons:

- Where construction vehicles will be moving
- Where temporary facilities will be placed such as toilets
- Where the bridges will be installed

The contractor shall strip the topsoil which includes the top 150mm of soil (or to the depth of the bedrock where the soil is shallower than 150mm) and root material of cleared vegetation, for subsequent use during rehabilitation. Topsoil shall be stripped from all areas of the working area where topsoil will be impacted by construction activities including areas for temporary facilities, as directed by the Engineer.

Stockpile area shall be identified by Eskom power stations EO (environmental officer) for SA Fence and Gate to comply to. Topsoil and subsoil stockpiles shall not exceed 2m in height and shall be so placed as to occupy the minimum width compatible with the natural angle of repose of the material, and shall be taken to prevent the material from spreading over too wide a surface.

7. PLANT & TOOLS REQUIRED FOR THE ACTIVITY

Plant

- Tipper truck
- Bomag Roller 90
- Excavator
- TLB
- Generator
- Water Tank
- Whacker
- Water pumps
- Drive unit + pokers
- Compressor
- Concrete spinner truck
- Mobile crane
- Banana Bucket
- Poker vibrator

Tools:

- Extension leads
- Grinder
- Skill saw
- Hilti Drill (sps)
- Breaker electrical
- Picks
- Shovels
- Rakes
- Shuttering
- Scaffolding
- Electric welder
- Reinforcement
- Dumpy Level
- Theodolite
- Hammers (14 Pound, 4 Pound and carpenter hammer)

- Spirit Level and builders line
- Nails (75mm and 100mm)
- Safety Harnesses
- Wheel Barrow

8. EXCAVATION

8.1 Preparation for Excavations

8.1.1 Permission

Before any excavations starts, the contractor shall apply for permission from the client (Eskom). Permission will be obtained by way of a permit to excavate. It must be determined if any unknown services are present inside the perimeter of the proposed excavation area. To do this the services of expert detection equipment or personnel will be utilised and will be included in the excavation permit.

8.1.2 Definitions (Excavations)

- **Excavation:** The act of ground-breaking, digging and taking out of earth; whether by hand or machine.
- **Bedding:** The act of preparing earth with machines, to specified standards, to ensure that the earth serves the desired purpose.
- **Backfilling:** The act of reintroducing excavated material to a specific area, either by hand or machine.
- **SANS:** South African National Standards.

8.2. Layout of the area of construction

Once the permit for excavation has been obtained the layout of the bridges and drop structures will be determined by the surveyor by incorporating the information provided on the drawings (0.90/25041 rev0; 0.90/25042 rev 0; 0.90/23490 rev 0; 0.90/25019 rev 0; 0.90/23491 rev 0; 0.90/23492 rev 0 **and** K5406-027; K5406-034; K5406-051; K5406-053) in accordance with the specific work needed. Profile stakes will be used in order to control the depth of the excavation by use of bonding rods. The actual

layout of the excavation area will be marked out by using either lime/cement/small rocks as reference markers for the operator.

8.3 Excavation

- All excavations shall be done by the following methods:
  - Hand excavation
  - TLB with small bucket
  - K9 Digger
  - Trencher
- All excavations shall be carried out under supervision and the excavator operator shall be trained, assessed and deemed competent to operate the excavator, by the supervisor.
- Excavated trenches shall be dug to a 45 degree angle.
- The area of work will be cleared of topsoil for the width of the excavations needed, to a minimum depth of 150mm or depth otherwise specified by the Engineer. After the topsoil material has been removed it will be stockpiled separately and reused after backfill.
- A TLB, Tipper, Grader and a Compaction Roller will be utilised to re-instate the topsoil as per specifications received from the drawings. Topsoil material will not be used as backfill.
- Excavated material will be placed alongside the excavated base, at least 1.5m from the excavated area. There will be strictly adhered to the dimensions or specifications for the width of the excavation to prevent over excavation.
- The depth of the excavation will periodically checked by a bonding rod and profiles to control the depth.
- Where hard material is encountered and which cannot be removed by and excavator, an air breaker/jack hammers will be used to clear the hard material.
- Where possible, excavation will commence at the lowest point, proceeding to the highest point. The Contractor (SA Fence and Gate) shall prevent the ingress of water as far as possible by utilising pumping equipment supplied to dewater the excavated area.

- All excavations are to be shored unless the excavation is sloped. Steep shoring will be accomplished using timber shutter boards backed by bracing planks. Written permission from the Contract Engineer will be obtained before sloping.
- The excavator shall be used according to its design and functionality.
- Excavation required is for reinforcement, and post foundation as per drawings (0.90/25041 rev0; 0.90/25042 rev 0; 0.90/23490 rev 0; 0.90/25019 rev 0; 0.90/23491 rev 0; 0.90/23492 rev 0 **and** K5406-027; K5406-034; K5406-051; K5406-053)
- The site plan from the client shall be used to avoid digging and damaging underground services thereby endangering the safety and health of any personnel. Testing to be done by Contractor prior to commencement of worked to locate any underground services in planned work area.
- The depth of the service must be known or determined to prevent damages on services.
- If any service is damaged Eskom will be notified immediately.
- A pre-ignition start inspection shall be conducted prior to assume excavation.
- If flooding occurs, excavations shall be inspected by the Contractor's Engineer and a written report shall be submitted declaring the excavations safe to work in.

8.4 Bedding

8.4.1 Levelling

Loose material will be removed from the excavated area. Bonding rods and profiles will be used to level the work. Once the area is level, the bottom will be compacted to 90% modified AASHTO maximum density or as stipulated on the drawings. Boulders that exist within the area of excavation will be removed and replaced with suitable material and compacted. Only after Quality Control has signed off will bedding be laid. Once level is correct, the bedding material will be compacted to 90% modified AASHTO maximum density in layers of 150mm - 200mm or as stipulated on the drawing.

8.4.2 Main fill

Selected fill material will be used to backfill the excavated area in approved layers until ground level. Heavier compaction equipment will be used to compact the area. Density tests will be carried out on each layer to ensure adherence to specifications. Water will also be utilised where necessary to achieve the optimum moisture level required for optimal density.

8.4.3 Stockpiling of Surplus Material

Once all backfill operations have been completed all of the excess excavated material (if any) will be loaded with appropriate plant and taken to an approved soil stockpile site.

9. CONCRETE WORKS:

Placing of concrete; incorporating steel fixing, formwork erections, placing/finishing of concrete; repairing of concrete.

9.1 Definitions:

- **Formwork:** Temporary forms/boards used to support and shape concrete to create a desired structure.
- **Cover:** the distance between the outside face of the concrete and the outside of the reinforcing steel within that element.
- **Slump:** An indication of the cohesion and workability of a concrete mix.

9.2 Resources:

The following is a list of proposed plant and machinery that will be utilised during the operation for the concrete works:

- Concrete spinner truck
- Mobile crane
- Banana Bucket
- Pocket vibrator

ACTIVITIES:

9.3 Fixing of Reinforcing Steel

9.3.1 Cutting of Steel Reinforcement

- Steels will be cut using a portable grinder or pliers used by somebody with experience and who has been inducted.
- All waste generated from grinding of reinforcement shall be disposed of at demarcated areas as indicated by client.
- All cutting equipment complied with OHS act in terms of safe guarding.
- Safety goggles shall be used at all times to protect employees' eyes from sparks or hazardous material entering eyes.

9.3.2 Delivery and offloading of steel

All reinforcing steel will be delivered to the site offices and then delivered to site with a LDV. Offloading will take place under supervision and the required plant will be used to ensure safe and effective offloading. The steel will be tagged for easy identification. Steel will be measured and verified during offloading to comply with the quality standards of the Contractor and the Client. The steel certificate will also be verified and kept on record at time of delivery.

9.3.3 Area of offloading

To ensure safe and effective offloading the delivery vehicle will be situated as close as possible to the offloading or storage area. Offloading will take place in such a manner to ensure that the movement of plant and people in site is not obstructed. Correct rigging practise will be implemented and followed at all times.

Care will be taken not to damage the steel or the delivery vehicle while offloading.

9.3.4 Fixing of Reinforcing Steel

- Steel reinforcement will be manually fixed as per drawing (0.90/25041 rev0; 0.90/25042 rev 0 **and** K5406-027; K5406-034; K5406-051; K5406-053)
- Labourers will use steel fixing pliers to fix reinforcements to each other and to stools as per drawing (0.90/25041 rev0; 0.90/25042 rev 0 **and** K5406-027; K5406-034; K5406-051; K5406-053)

9.4 Storage and transport on site of Reinforcing Steel

9.4.1 Area of storage

Steel will be stored at the site offices and transported to site or area of fixing by a LDV. Steel will be stored in demarcated areas in labelled bundles and care will be taken to prevent the steel from coming into contact with soil or mud. When transported to site, the steel will be stored as close as possible to the area of fixing as possible. All reinforcing steel will be cleaned and free of debris before utilising it.

At the storage area the steel will be stacked no higher than 3 times the smallest size of the base. Steel will be stacked in such a manner as to ensure adequate space between stacks. Walkways will be kept clean and clear.

Transport of steel to site will only take place with a vehicle that has gone through the inspections and was issued with a permit. All operators will have completed medical inspections and underwent induction before transporting any material. The relevant permit for driving will also be obtained. All operators will adhere to the Client's rule with regard to driving; that is staying on designated roads and not drive into the veld. All loads will be secured on the back of the vehicle or trailers.

9.5 Placing and Fixing

9.5.1 Placing and Fixing

Using the applicable drawings as reference the reinforcing steel will be placed and fixed into position, according to specific size and shapes, by

means of tying the elements together with binding wire, suitable clips or by welding where necessary. All reinforcing steel fixed in place will be cleaned of mud, oil, loose rust or any other substances prior to concrete being placed. Offcuts generated during fixing and installation of reinforcing steel will be collected and removed for disposal prior to concrete being poured.

Where spacer/cover blocks are necessary, they will be cut to the required size and shape and they will be off the required material. The blocks will be secured to ensure that the necessary clearance, cover and spacing are achieved.

Laps, joints and splices will be as indicated on the drawings or as directed by the Engineer.

Protruding bars that will be exposed to the elements for prolonged periods of time will be protected against corrosion with end caps in place.

9.5.2 Corrective Action (if any)

Any material utilised incorrectly will be removed and replaced correctly. Any material that has been contaminated will be removed and disposed of in the correct manner.

9.6 Erection of Formwork

9.6.1 Delivery and offloading

All formwork and false work will be delivered to site by the approved supplier/contractor. Offloading will take under supervision and by utilising the necessary resources.

9.6.2 Area of offloading

To ensure safe and effective offloading the delivery vehicle will be situated as close as possible to the offloading or storage area. Offloading will take place in such a manner to ensure that the movement of plant and people in site is not obstructed. Correct rigging practise will be implemented and followed at all times.

Care will be taken not to damage the steel or the delivery vehicle while offloading.

9.6.3 Outside Shuttering (Bottom slab - Bridges)

- Start by setting out the outer layout of the bridge by chalking the outer measurements (0.90/23490 rev 0; 0.90/25019 rev 0; 0.90/23491 rev 0; 0.90/23492 rev 0), then proceed to construct shuttering according to layout.
- Shuttering will be put in place, placed in line and stayed.
- Shutter oil will be applied to shutters before the steel fixers commences with work.
- Steel fixers will then start with the bottom layer of steel which will be placed on 50mm cover blocks.
- Eskom will then inspect and after approval concrete will be placed by concrete hands.
- Concrete will be placed with shovels and concrete will be vibrated with a drive unit with a 50mm poker.
- Concrete will then be levelled and flouted.
- After concrete has set, curing compound will be applied with a block brush.
- For full concrete specifications refer to clause 9.7 of this document.

9.6.4 Outside Shuttering (Drop Structures)

- Start by setting out the outer layout of the drop structure by chalking the outer measurements (Refer to drawings: K5406-027; K5406-034; K5406-051; K5406-053), then proceed to construct shuttering according to layout.
- Shuttering will be put in place, placed in line and stayed.
- Shutter oil will be applied with a block brush.
- Steel fixers will then plait the steel horizontally and vertically.
- Eskom will then inspect the work.
- Concrete will then be poured with a crane or straight discharge.
- Concrete will be vibrated with drive unit and 50 mm poker.

- Concrete will be levelled with shovels and straight edge.
- Concrete will be flouted after it has set.
- Curing compound will be applied with a block brush.
- For full concrete specifications refer to clause 9.7 of this document.

9.6.5 Centre Wall (Bridges)

- Shuttering wall will be put in place, placed in line and stayed.
- Shutter oil will be applied with a block brush.
- Steel fixers will then plait the steel horizontally and vertically.
- Eskom will then inspect the work.
- After inspection the second shutter wall will be put in place, placed in line and stayed.
- The last inspection will then take place (Cover Inspection).
- Concrete will then be placed with crane and vibrated with drive unit and 50 mm poker.
- For full concrete specifications refer to clause 9.7 of this document.
- After concrete has set all shutters will be manually stripped.

9.6.6 Top slab (Bridges)

- Staging for the top slab will commence as soon as all shutters have been stripped.
- Shuttering wall will be put in place, placed in line and stayed.
- Shutter oil will be applied with a block brush.
- After staging the decking panels will be installed for the top slab.
- The outline of the top slab will be done as per drawing (0.90/23490 rev 0; 0.90/25019 rev 0; 0.90/23491 rev 0; 0.90/23492 rev 0).
- Outside shutter will be constructed for top slab.
- Steel fixers will then plait the steel horizontally and vertically.
- Eskom will then inspect the work.
- After steel reinforcements have been inspected the pouring of the concrete will take place (refer to clause 9.7 of this document).
- Concrete for top slab will stand for 7 days to cure, after which all shuttering and staging will be stripped.

Erection of the formwork will take place in accordance with the specifications on the drawings using appropriate quantities of support work to ensure the safety of these in the workings. Care will be taken to ensure that all elements and materials used in the formwork are free of defects to ensure that the formwork is stable and secure. The required equipment such as clamps, jacks and fittings will be in good working condition and of the correct design and strength.

The face of the formwork that comes in contact with the concrete will be of the required specification to achieve the necessary concrete finish. The panels that are joined together will be secured tightly to prevent leakage of concrete. Temporary openings in the formwork will be left for inspection, cleaning and placing of concrete.

The finished formwork will be inspected to check for alignment, evenness, tightness of bolts, clamps ties and bracing. For the bottom and top slabs the formwork will be erected and finalised before reinforcing steel is installed. Where walls are erected the reinforcing steel will be fixed and checked prior to the formwork being erected.

Openings and box outs will be provided only as shown on the drawings. These will be rigid in construction and securely fixed in place to prevent moving.

9.6.7 Removal of formwork

Only when the concrete is strong enough to support its own weight or any loads applied to it, will the formwork be removed. The minimum time formwork is to remain in place during normal conditions will be:

	OPC	Rapid Hardening OPC
Walls	0.75	0.5
Slabs (propped)	4	2
Slab props	10	5

Care will be taken to remove material carefully to prevent shock or damage to the concrete surface. Any damage to the concrete caused by formwork removal will be regarded as a defect in terms of SANS 1200 G clause 5.5.14 and repaired in accordance with the approved NCR and CAR repair procedure which is found within SANS 1200 G. All formwork will be cleaned and checked before reusing it.

Should the ambient temperature be considered “cold”, the period for removal will be increased as specified in the SABS 1200 G - 1982 clause 5.2.5.2

9.6.8 Corrective Actions (if any)

Reparations of blemishes and defects on the surface will be done by using mortar of the same cement sand ratio as the concrete being repaired. Large defects will be repaired by approved methods only. If the integrity of the concrete is in doubt, the whole structure will be rebuilt.

9.7 Concrete Placement

Ready mix concrete will be bought at Crocodile

9.7.1 Casting of Concrete - READY MIX

- Before concrete is cast inspections will take place by a competent person.
- 25Mpa ready mix will be delivered on site with a POD (Proof of Delivery) that will be used by the employees.
- The casting of the concrete will be done direct from the ready mix truck by the use of the shoot; in case a wheelbarrow is needed it will be available on site. It will be inspected on a daily basis.
- For bottom slab concrete will be left overnight to cure.
- A slump tests will be done and when cubes are being taken (the slump must be 90mm). Cube samples (6 cubes) will be taken at least one per day or per 50m3 of concrete.
- Test cubes will be tested by an independent laboratory. 3 at 7 days and 3 at 28 days. Results will be forwarded to Eskom for verification.

9.7.2 Placing

The necessary approval for concrete placing will be obtained prior to placing and the element that needs to be cast will be inspected beforehand. All unwanted debris and material such as water and loose soil will be removed from the element before concrete placing. 2 Hours after mixing the concrete, it will be placed in its final position.

A slump test will be conducted on the batch of cement when it arrives on site. The measured slump will be within the following limits:

For reinforced walls and slabs - 70mm +- 25mm (or otherwise specified)

For reinforced floors - between 80mm +- 25mm (or otherwise specified)

The slump test will be carried out in accordance with SABS method 862 and shall be determined from the approved average slump of the approved trial mix as per Kusile specifications for structural concrete doc 203 770 Rev 04, clause VA.G.5.5.1.2.

In order to achieve the required slump, no additional water will be added to the mix. In order to ensure that the concrete can be placed in the corners of the formwork and around the reinforcing without segregation, the consistency of the concrete will be of such standard to achieve this, without segregation of the mix or the bleeding of water.

The concrete will be placed vertically, where possible, to prevent segregation of the mix or the displacement of the reinforcing. The concrete will not be allowed to free fall a height exceeding 1.5m unless approved by the Engineer. The concrete will be brought in in layers of 450mm thickness and will not be worked by means of a vibrator to flow laterally, so as to prevent segregation.

The angle of the shoot (if one is used) will be controlled to prevent segregation. Baffles will be used to control the rate of discharge of the cement when using a shoot. If a pump is used it will be approved by the Engineer.

A vibrating poker will be used to compact the concrete and the poker will be inserted into the concrete to ensure vibration takes place from the lower layer into upper layer. Attention will be given to ensure over vibration does not take place. Concrete placing will take place in accordance with compaction equipment available.

Finishing will take place by floating a wood or steel float depending on the required surface finish. Construction joints will only be permitted where indicated on the drawings. In the case of a plant breakdown, an emergency construction joint will be finished in a way that least impairs the durability, appearance and functioning of the concrete element.

In the event of heavy or prolonged rainfall, no concrete will be placed.

9.7.2.1 Placing concrete in cold weather conditions

Note: Cold weather is defined as a period when, for more than three consecutive days, the average daily temperature is less than 4.44°C [ACI 306.1-90]. When cold weather conditions are anticipated to be present the concrete suppliers will be contacted to take the necessary precautions for mixing the concrete.

No concrete will be placed on frozen sub grade due to bulking and freeze thaw. Frozen sub grade material will be thawed thoroughly using external heat and insulation prior to concreting. All concrete placements will be vibrated mechanically.

9.7.2.2 Placing concrete in hot weather conditions

Note: Where the air temperature is above 30°C, the temperature of the placed concrete should not exceed 30°C. Hot weather conditions are therefore considered to be temperatures that exceed 30°C. When hot weather conditions are anticipated to be present the concrete suppliers will be contacted to take the necessary precautions for mixing the concrete.

To ensure that the concrete is placed at the right temperature the following precautions will be taken:

- Shading the aggregates before placing
- Spraying the aggregates with water to cause evaporative cooling

9.7.3 Curing

Curing of the concrete will take place, after the concrete has gained sufficient strength and the formwork has been removed, by wetting the surface continuously with a fine spray, covering the concrete with plastic sheeting, or by applying an approved curing compound. Curing with take place over a minimum period of 5 days and care will be taken not to damage the surface of the concrete.

9.7.3.1 Curing concrete in cold weather conditions

Note: Cold weather is defined as a period when, for more than three consecutive days, the average daily temperature is less than 4.44°C [ACI 306.1-90]. When cold weather conditions are anticipated to be present the concrete suppliers will be contacted to take the necessary precautions for mixing the concrete.

In order to provide insulation against the cold conditions the concrete shall remain in forms for as long as practicable possible. After the removal of the forms, the structures will be covered by insulation blankets. Water curing will also not take place in cold weather; instead curing compound will be used to paint the face of the concrete. The curing will be applied for at least 5 days.

9.7.3.2 Curing concrete in hot weather conditions

Note: Where the air temperature is above 30°C, the temperature of the placed concrete should not exceed 30°C. Hot weather conditions are therefore considered to be temperatures that exceed 30°C.

When hot weather conditions are anticipated to be present the concrete suppliers will be contacted to take the necessary precautions for mixing the concrete.

Curing should receive special attention and should start as soon as possible during hot weather.

To ensure that the concrete cures correctly in hot weather the following precautions will be taken:

- Shade netting will be installed over the formwork to get the temperature down.
- After concrete has been floated, curing compound will be applied to prevent cracks.
- Programme concreting for the cooler parts of the day (early morning, late afternoon).
- Cooling formwork with water spray can also be considered.

9.7.4. Monitoring of Temperature

Thermostats will be used to determine the temperature and care will be taken to ensure the temperature of the concrete, from the time of hardening is maintained at not less than 5°C for cold weather and not more than 30°C for hot weather.

9.7.5 Testing

The tolerances set out in the specifications by Eskom will be adhered to at all time. These tolerances will apply to the fixing of reinforcing steel, erecting the formwork and concreting of elements. Any deviations from these tolerances will be approved by the Engineer.

In order to determine and ensure that the concrete is of the required strength, cube moulds will be made of the placed concrete. Samples will be taken as follows: 6 cube moulds will be made for each day's cast element and for at least every 50m³ placed. Only one sample will be taken of a batch and only after 3 batches of the same strength concrete has been mixed, will another sample be taken, unless otherwise instructed. The first set of 3 cubes will be tested at 7 days curing and the second 3 cubes at 28 days. This is in accordance with Kusile Specifications for structural concrete, clause VA.G.7.1.2. Sufficient slump cones and cube moulds will be provided to ensure the correct frequency of sampling. The crushing of the cubes will be conducted at an approved laboratory. All tests will be in accordance with project specifications.

9.7.6 Concrete Repairs

9.7.6.1 Honey - Combing

In the event of Honey-Combing appearing the following will be implemented to rectify the problem:

Ensure that all participating employees wear PPE. Remove any loose material until structurally sound concrete is attained. Apply wet to dry epoxy should the concrete be past green stage. Use shuttering to form up the profile of the wall. Pour liquid non-stick grout to fill all voids. Cure for 72 hours. Strip shuttering. Do necessary quality checks. ABE-FC (grout) will be used to fix honey combing and cracks between 0 and 10mm. ABE-FR (grout) will be used for cracks larger than 10mm.

9.7.6.2 Major Crack Repair

In the event of major cracks appearing the following will be implemented to rectify the problem:

Chip along the crack at least 2 cm in width and as deep as the crack extends. The cavity will be cleared off all loose particles, dirt, grease, and paint with a point tool or chisel. Moisten the substrate prior to application. Apply the sealant as per manufacturer's standard. Allow to dry and do checks again.

9.7.6.3 Map Cracking

In the event of map cracks appearing the following will be implemented to rectify the problem:

The large, central crack will be filled with latex caulk. The top of the caulk gun will be inserted into the crack as far as possible. The crack will be filled to the brim. A putty knife will be used to smooth the surface. A new, thin coat of concrete shall be applied with a metal trowel. Allow several hours for new concrete to set. The surface will be inspected and if necessary a second layer of concrete will be applied. The concrete will then be covered with a plastic tarp and left to cure for 7 days. Curing compound will be sprayed on the surface daily to allow the concrete to cure evenly. After the

curing process is complete two coats of sealant will be applied with a paint roller.

9.7.6.4 Curling

In the event of Curling appearing the following will be implemented to rectify the problem:

Grinding and grouting will be typically used on slabs. At the elevated edges and corners and under slab voids holes will be drilled and filled with grout. After the grout hardens, the curled edges shall be ground to the desired profile. After the voids under the slab are grouted, the curled are will be repaired by saw cutting around the area to be patched, chipping out concrete below the desired profile, and patching to the required elevation.

9.7.6.5 Fine Dust forming on the surface

In the event of Fine Dust appearing the following will be implemented to rectify the problem:

A chemical floor hardener will be applied. In severe cases the method of grinding and polishing the surface can be utilised.

9.7.6.6 Pop - Outs

In the event of Pop-Outs appearing the following will be implemented to rectify the problem:

Pop-outs will be repaired by first cleaning the holes out with a broom or shop vacuum and a drill will be used to remove any unstable material. Each hole will be filled with concrete using a trowel. Patching concrete with a bonding agent will be used. Larger holes will be cleaned and a chisel will be used to remove any loose material. Concrete will then be poured over the area and spread with a trowel and left to cure.

9.7.6.7 Flaking

In the event of Flaking the following will be implemented to rectify the problem:

A pressure washer will be used to clean the surface of the concrete. Any depressions caused by the flaking will be filled with epoxy mortar; all cracks will be repaired using mortar. An acid wash will be applied which will roughen up the floor surface so the primer will stick. The primer will be applied and spread with a broom and concrete will be applied while the floor is still wet. The concrete finish will be spread with a sponge while a trowel will be used to detail the edges. A trowel or broom will be used to create a finish texture. The finish will be allowed to cure for 24 hours.

10. CONTROLS AND CHECKS

The QC will continually perform spot checks on all working sites to ensure adherence to all Method Statements/Process Controls. Refer to ITP. Should a non-conformance be noted, a Non Conformance Report will be completed and handed to the applicable person. A Non Conformance Report register will be kept.

11. CONSTRUCTION OF TEMPORARY DAMS

Prior to commencement of bridges and drop structures temporarily retaining dam walls will be constructed to ensure dry working space. Gabions filled with dump rock (2m x 1m x 1m) will be used to form the temporarily structure. Fill obtained from fence excavations will be imported and compacted in layers at inner side of gabion wall 4m wide. USB Green DPM will be inserted between gabions and filling to ensure a water tight construction. To ensure the natural flow of water when experience heavy rainfall, two 160mm diameter drains / overflows will be inserted 800mm from the top of the temporarily structure. Water pumps will also be used to ensure that rising water levels is not affecting construction of permanent work. Permission and approval from the Engineer will be obtained before constructing the temporary dam walls.

12. QUALITY CONTROL AND ASSURANCE

All quality control will be executed by SA Fence and Gate in conjunction with prescribed specifications of Eskom.

A Quality control officer of SA Fence and Gate will liaise with Eskom's quality department to ensure that all requirements are met.

13. HEALTH AND SAFETY

This method statement will apply to the clearing, excavating, compacting and loading of material, waste management, casting concrete, plant equipment and PPE to be worn on site when carrying out this tasks/works by SA FENCE AND GATE.

13.1 Terms, Definitions, Abbreviations

"QA/QC" Means Quality Assurance / Quality control Officer.
"PPE" Means Personal Protective Equipment.
"SO" Means Safety Officer
"OHSA" Means Occupational Health and Safety Act
"EO" Means Environmental Officer.
"Excavation works" Means the making of any man made cavity, trench, pit or depression formed by cutting, digging, or scooping.
"MSDS" MEANS Material Safety Data Sheet.

13.2 Responsibilities, Authority and Accountability SHEQ will ensure :

- Tool box talks will be carried out at the beginning of each work day with all employees prior to work commencing.
- No employee will be allowed access within the excavation area while the TLB/Excavators are busy working.
- Adherence to the 3m rule is compulsory at all times
- Protection around the excavations will be installed. A barrier fence of at least 1m high and as close to the excavations as possible will be installed. Warning signs are to be posted on these barriers/fences.
- All employees and contractors involved in this activity are competent to do so.
- All employees and contractors are required to conduct this work undergo a SHEQ induction.
- Employees must ensure that they were their PPE at all times.

- Dust masks are compulsory during dusty conditions.
- Access ladders will be secured by tying them down at the top and bottom.
- All operators have to be licenced and certified. Copies of such documents will be kept on file at the Site Office.
- All employees and contractors involved in this activity are trained with regards to the content of this Method Statement

13.3 SHE implications/controls

13.3.1 Excavation

- Prior to work commencing at the start of each day, tool box talks will be held with all employees.
- No employee will be allowed access within the confines of the excavated area whilst TLB/Excavators are busy excavating.
- Spotters will be employed to ensure that no employee is dangerously close to the TLB/Excavator.
- All excavated trenches shall be barricaded to prevent any person/any excavator and other construction vehicles on site from falling into the trench or the excavation.
- Employees must at all times ware PPE and dust mask are compulsory in dusty conditions.
- All operators must be licenced and certified.

13.3.2 Bedding and Levelling

- No employees are allowed in areas where TLB/Excavators are busy with removal of loose materials.
- When compaction is taking place all employees are to be removed from the area.
- When a Whacker is being used to compact the soil the operator will be changed every 30 minutes. The safe work procedure (SWP 001) for the Whacker must be discussed with the employees and signatures obtained.

13.3.3 Backfilling

During backfilling the following will apply, and be adhered to at all times:-

- The Foreman will be present at all times.
- The Foreman is accountable for all employees at all times, and must therefore be fully aware of the number and work-area of employees.
- Spotter in place to direct trucks to the backfilling area.
- Spotters to wear full PPE including long sleeve reflective vest, 500mm x 500mm red flag and whistle.
- All employees to be cleared from areas where mobile machinery is at work.
- Employees to adhere to the 3m rule from moving machinery.
- Trucks not to be overloaded.
- Employees are not allowed to stand closer than 1 meter from the edge of an excavation, to prevent any collapse of the sides of the excavation.
- Excavation to remain fully barricaded until backfilling is level.
- Backfilling materials will be obtained from approved areas only.
- Operators must adhere to demarcated roads. No travelling in veld or protected areas.
- Before trucks discharge backfill material, stop blocks to be applied to vehicle.
- All valve chamber covers will be securely installed & clearly marked.

13.3.4 Delivery and Offloading of Steel

- The driver of the delivery vehicle must have a valid driver's licence in order for him to be allowed on site. All delivery vehicles will be escorted to the offloading site by a licenced SA Fence and Gate employee. The delivery truck must be compliant in the sense of not being overloaded and the load must also be secured on the truck or vehicle.
- The appointed stacking and storage foreman will be present to ensure that stacking and storage is done correctly. Communication of the safe work procedure for stacking and storage of material (SWP 002) should be done with employees before work commences.

- All employees taking part in offloading of material must signs the necessary documentation to indicate their compliance to the method of offloading and the safe work procedure. The reinforcement steel will only be offloaded in the designated offloading area approved by the Engineer. The laydown area will be demarcated and barricaded with the necessary signage and warnings attached and all employees must sign the risk assessment form communicated to them regarding the laydown area. No steel shall be stored outside the assigned area.

13.3.5 Placing and Fixing

- All employees involved in fixing steel, will have their gloves and safety glasses on at all times. The supervisor will ensure compliance.
- If there is a need to work at heights, access will be provided by means of scaffolding. Scaffolding will be erected and inspected by trained and competent employees. All scaffolding will have adequate bracing, toe boards, knee rails and hand rails. All scaffolds will be on a register and should be inspected after rain, heavy winds or any changes made to the scaffolding.
- All persons working at heights will have the required training and wear double lanyard safety harnesses which will be hooked up at all times. The fall protection plan will be discussed with all employees working on heights. Tools being used on heights must have lanyards fitted to them to prevent them from falling on employees at the bottom.
- When bases being fixed get too large, and the employees have to walk on the bases, scaffold boards are to be placed on top of the bases creating a 600mm walkway, tied down to the reinforcing steel, for the employees to walk on. No employees will be allowed on bare reinforced steel.
- When fixing soffits/suspended slabs, adequate hand railing and barricading will be erected at +- 1m from the finished top of the concrete level.
- When fixing bases with vertical bars, care will be taken to temporarily fix diagonal braces to counteract the potential for the bars to lean over and

fall. Diagonal temporary stiffeners/braces will be installed at every 10m. During long pours, no employee will exceed a 12 hour shifts.

13.3.6 Concrete works

- Once the truck has arrived at the designated are a spotter will direct the truck into position and ensure that no employees are in the vicinity of the trucks. As soon as the truck is in place, stock blocks will be inserted behind the wheels of the concrete truck. When the employees lower the concrete chute, the supervisor should ensure that all employees are wearing gloves and use the handles on the chute to lower it.
- Before concrete pouring commences the concrete pouring the concrete work safe work procedure (SWP 003) needs to be communicated to all employees and signed. The concrete truck operator will only start pouring once the supervisor has given the instruction.
- Employees that are working on vibrating the concrete must wear gum boots to prevent concrete getting into their shoes and on their skin. Full PPE must be worn.
- While employees are standing on the reinforced steel vibrating the concrete, scaffold planks should be placed for them to walk on. No employees are allowed to walk on reinforced steel.
- Concrete being poured where employees have to work at height, scaffolding will be provided for employees to stand on. Employees working at heights will have the required training.
- Scaffolds will be erected and inspected by competent appointed employees. Employees working at heights will make use of a double lanyard safety harness, and be hooked at all times. All scaffolding is required to have toe boards, knee rails, handrails and access by ladder.
- Any concrete spills must be cleaned up immediately and disposed of properly. Concrete trucks may only clean their trucks at areas designated by the client. This area needs to be cleaned regularly. In all cases a spill kit will be on hand.

13.3.7 Concrete Repairs

- All personnel to wear PPE at all times.
- Shuttering and stripping will be done by competent shutter hands.
- Working platforms will be kept clean.
- MSDS for all products used in repair process will be obtained and communicated to personnel.
- During stripping nails on wood shutters to be removed and discarded.
- Workers to be careful of pinch/nip points.
- All operators of electrical equipment will be trained.
- Sprinkling of water will be used to suppress dust during breaking and drilling.

13.4 Using of a ladder

- Training will be provided.
- Daily toolbox talks will remind employees on how to use a ladder.
- Not more than one person on a ladder.
- When a person is on the ladder one person must always hold or support the ladder.
- Ladder instructions must be read and practiced daily.
- Don't use the top 3 rungs on the ladders.
- When you have tools that you want to use on the top of the ladder use a bucket.
- Three point contacts are very important.
- Eyes on path at all times.

13.5 Personal Protective Equipment

We shall wear the Personal protective equipment clothing listed at all times when on site. No workers shall be permitted on site without the full PPE as specified.

- Hard hat.
- Goggles.
- Overalls with high visibility reflector vest.
- Steel toe boots / gumboots in wet areas.

- Dust mask.
- Ear plugs (when working in a noisy area).
- All employees will be equipped with their PPE and no one shall be on site without the above required PPE.
- The PPE clothing is applicable to everyone coming on site.

13.6 First Aid, emergency equipment and procedure

- We will ensure that persons at work receive prompt first aid treatment in case of injuries or emergency.
- We will provide first aid box or boxes at or near the work place which shall be available and accessible.
- No persons are allowed to carry on with their task in case an emergency siren or alarm sound.
- Report any incident/accident immediately to supervisor or safety representative on site.
- Every minor injury shall be treated on site by the competent first aider as OHS act.
- All people working on site will undergo induction, safety awareness training and environmental training with regarding emergency procedures, fire, or electrical shut down.

13.7 Housekeeping (on daily basis)

- We shall continuously maintain and implement housekeeping on our construction site to avoid injuries to persons on site, client, visitors and or sub-contractors.
- Everything in its place. No materials or hand tools will be lying on the ground when not in use.
- We shall store them safely in the toolbox on site.
- All waste scrap produced on site shall be removed at appropriate intervals to enhance a healthy and safe environment for persons working on site.
- No smoking or dumping on site shall be permitted unless it is a demarcated smoking area to avoid cigarette butts on the ground.

14. ENVIROMENTAL

14.1 Vegetation Clearing and Topsoil Removal

SA Fence and Gate shall ensure that the clearance of vegetation is strictly restricted to the area required for the work (such as the fence will be erected, toilets will be placed and access roads where vehicles and workers will walk).

- All cleared vegetation will either be mulched and mixed into the topsoil or disposed at an approved disposal site.
- All disposal of vegetation by burying or burning is prohibited.
- Topsoil will be stripped which will include the top 150mm of the soil, for subsequent use during rehabilitation and re-vegetation.

14.2 Noise

The contractor does envisaged that the project will generate excessive noise (more than 85 dB), but instances whereby the equipment such drilling machine will be used, the workers will be advised to wear ear plugs.

14.3 Dust

It will be suppressed according to the client's standard environmental specification. Eskom's Environmental officer will issue a permit to SA Fence and Gate for extraction of water to be used for dust suppression. A water tanker shall be permanently available on site for the control of dust generation, and SA Fence and Gate shall ensure that the sprays do not generate excess run off. During high wind conditions, SA Fence and Gate shall comply with the Engineer's instructions regarding dust dumping measures.

An appropriate number of water tankers shall be permanently available for the control of dust generation, and the Contractor shall ensure that the sprays do not generate excess run off. There shall be sufficient water tankers of adequate capacity to enable the dampening of all working areas and access/ haul roads. During high wind conditions, the Contractor shall

comply with the Engineer's instructions regarding additional dust-damping measures.

14.4 Emergency preparedness

Telephone numbers of emergency services, including local fire fighting services are pasted in all offices of SA Fence and Gate, and all employees are made aware on the evacuation routes, from all their workplace, in case there is an emergency of fire for them to relocate their workplace. Assemble points are noted for such cases.

14.5 Accidental leaks and spillages

In the event of a spill, the source of the spillage shall be isolated, the spillage will be contained. The area where the pillage incident has occurred shall be cordoned off and secured. SA Fence and Gate shall maintain spill kits on the site at all times and shall ensure that there is always adequate supply of absorbent material available in the spill kit.

14.6 Flora and Fauna

Poaching of animals will not be allowed on site, should animals be seen on site, the will be reported to the Environmental Officer competent to rescue such animals.

14.7 Ablution facilities

SA Fence and Gate shall provide adequate ablution facilities for workers in the construction camp. Acts of excretion and urination shall be strictly prohibited other than at the facilities provided.

I. Toilets shall be located within 100 m from any points of work but not closer than 50 meters to any watercourse or water body,

II. Mobile toilets will be provided so that it will be moved as the process of fence erection goes on.

III. Toilets shall be secured to the ground to prevent them from toppling due to wind or any other cause;

IV. No spillage shall occur when the toilets are cleaned or emptied and the contents shall be properly removed from site by Sanitech,

V. Discharge of waste from toilets into the environment and burial of waste is strictly prohibited,

VI. Toilets shall be provided with external closing mechanism to prevent toilet paper from being blown out, and

VII. Toilets will be emptied before long weekends and builder's holidays and shall be locked after working hours.

14.8 Solid waste management

The management of solid waste at the working area shall be strictly controlled and monitored; the quantities of waste generated shall be minimized as wheelie bins will be provided by Roshcon. Littering will be avoided, there will be no burying, dumping and burning of waste material shall occur. Bins shall never be allowed to overflow and shall be emptied twice in a week. All solid waste will be collected by Roshcon and be disposed off-site at an approved landfill site.

14.9 Accommodation of traffic

SA Fence and Gate shall ensure vehicle traffic safety at all times and shall implement safety measures. Fence and Gate shall control the movement of all the vehicles and equipment including of the suppliers so that they remain on designated routes. On gravel road on the site and within 500 m of the site, the vehicles of Fence and Gate and the suppliers shall not exceed a speed of 40 km/h.

14.10 Landscaping and Rehabilitation

Rehabilitation will be done during the process of erecting (on-going process e.g. before erecting fence on point B, the top soil that was removed from point A, will be backfilled to where it was removed).

14.11 Prevention of fire

SA Fence and Gate shall take adequate precautions to ensure that the fire hazard on and near the site is reduced to a minimum. Smoking shall not be permitted on site, it will only be allowed in areas designated as smoking area.

14.12 Installation

Installation of all material will be done as per the client's standard environmental specification, together with the addendum from DEA.